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Hazard assessment of moraine-dammed lake outburst floods in the Chinese Himalaya

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With the climate warming recently, Glacier Lake Outburst Floods (GLOFs) are increasingly threatening people and property and are intensively studied worldwide. The region of Chinese Himalayas was chosen as the study area in this paper where the GLOFs were frequently taken place during the past decades. The 142 potentially dangerous glacier lakes were first identified by 6 indexes indicating the potentially dangerous glacier lakes in the study area. Then, the breach probabilities of the 142 potentially dangerous glacier lakes were further calculated by means of decision-making trees methods one by one based on the data of large scale topographical maps, DEM, ASTER images and etc. The results show that (1) There are 142 potentially dangerous moraine-dammed glacier lakes in the Chinese Himalayas; (2) The breaching probabilities (p) of the 142 potentially dangerous moraine-dammed lakes range from 0.037 to 0.345. They can be further rated as 43 lakes with very high breaching probabilities (i.e. $p \geq 0.24$), 47 lakes with high breaching probabilities ($0.18 \leq p$ [U+FF1C] 0.24), 24 lakes with median breaching probabilities ($0.12 \leq p$ [U+FF1C] 0.18), 24 lakes with low breaching probabilities ($0.06 \leq p$ [U+FF1C] 0.12), and 4 lakes with very low breaching probabilities (p [U+FF1C] 0.06). The 90 lakes with very high and high breaching probabilities are requested to go along another further detailed breaching risk assessment.